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I HEREBY CERTIFY that annexed hereto is a true copy of documents filed in connection with the following patent application:

Application No: S2003/0721

Date of Filing 1 October 2003

Applicant TECHNOLOGY INVESTMENTS LIMITED, an
Irish company of Gibbstown, Navan, County
Meath, Ireland,

Dated this 7 day of October 2004.



Coherly

An officer authorised by the
Controller of Patents, Designs and Trademarks.

REQUEST FOR THE GRANT OF A PATENT

PATENTS ACT 1992

The Applicant(s) named herein hereby request(s)
[] the grant of a patent under Part II of the Act
[X] the grant of a short-term patent under Part III of the Act
on the basis of the information furnished hereunder.

1. Applicant(s)

TECHNOLOGY INVESTMENTS LIMITED.
Gibbstown
Navan
County Meath
Ireland
an Irish Company

2. Title of Invention

Articulated vehicle roll control system

3. Declaration of Priority on basis of previously filed application(s) for same invention (Sections 25 & 26)

<u>Previous Filing</u> <u>Date</u>	<u>Country in or for</u> <u>which filed</u>	<u>Filing No.</u>
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4. Identification of Inventor(s)

Name(s) and addresse(s) of person(s) believed
by the Applicant(s) to be the inventor(s)
Eanna Pronsias Timoney
an Irish Citizen of St Anthony's, Boyne Road, Navan, County Meath,
Ireland

5. Statement of right to be granted a patent (Section 17(2) (b))

The applicant derives the right to apply by virtue of a Deed of Assignment dated September 30, 2003

6. Items accompanying this Request

- (i) [X] prescribed filing fee (Euro 60.00)
- (ii) [] specification containing a description and claims
[X] specification containing a description only
[X] Drawings referred to in description or claims
- (iii) [] An abstract
- (iv) [] Copy of previous application(s) whose priority is claimed
- (v) [] Translation of previous application whose priority is claimed
- (vi) [] Authorisation of Agent (this may be given at 8 below if this Request is signed by the Applicant(s))

7. Divisional Application(s)

The following information is applicable to the present application which is made under Section 24 -

Earlier Application No.
Filing Date:

8. Agent

The following is authorised to act as agent in all proceedings connected with the obtaining of a patent to which this request relates and in relation to any patent granted -

Name & Address

Cruickshank & Co. at their address recorded for the time being in the Register of Patent Agents is hereby appointed Agents and address for service, presently 1 Holles Street, Dublin 2.

9. Address for service (if different from that at 8)

Signed Cruickshank & Co.

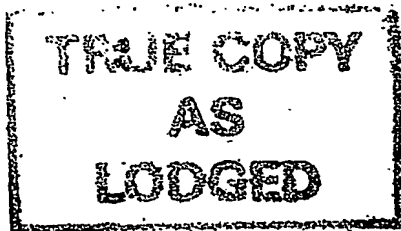
By:-

C. J. Schmitt

Agents for the Applicant

Executive.

Date October 01, 2003.



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A/M 22/Tamp 1/01/10.08

- 1 -

"Articulated vehicle roll control system"

This invention relates to an articulated vehicle roll control system, and in particular to an articulated dump truck roll control system.

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It is well known to provide articulated dump trucks of the type comprising a tractor unit, connected to a trailer unit via an articulating hitch. The hitch is free to rotate about the longitudinal and vertical axes of the truck but is unable to rotate about the transverse axis. Steering is achieved by the forced articulation of the hitch about its vertical axis, by means of rams for example, creating an angle between the tractor and the trailer unit.

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When any vehicle corners there is a shift of the load to the outside wheels due to the centrifugal acceleration of the turn. A major disadvantage of the articulated steering system described above is that as the vehicle turns, the outside wheel on the tractor unit moves closer to the centreline of the vehicle and thus carries a greater proportion of the axle load. This effect, combined with the centrifugal roll, causes the tractor unit to roll to an extreme angle, and thus limits cornering speeds and driver comfort and confidence.

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The present invention is directed towards overcoming this problem.

According to the invention there is provided a roll control system for an articulated vehicle having a tractor unit connected to an associated trailer unit by an articulating hitch, said system having means for controlling operation of the vehicle suspension system in response to roll of the vehicle.

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In a particularly preferred embodiment said means controls operation of the tractor suspension system in response roll of the tractor unit.

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In one embodiment the system includes means for stiffening the suspension in direct proportion to the amount of roll.

In another embodiment the system includes means for locking the suspension when a

preset roll angle is reached.

5 In a further embodiment the system includes means for controlling operation of the suspension system in response to the sensed turn angle between the tractor and the trailer.

10 In another embodiment the system includes means for sensing turning of the tractor unit relative to the trailer unit and suspension locking means operably connected to the sensing means to lock the suspension when a preset turn angle is reached, and release the suspension for normal operation below said preset turn angle.

15 The invention will be more clearly understood by the following description of some embodiments thereof, given by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a diagrammatic plan view of a vehicle incorporating the roll control system of the invention;

20 Fig. 2 is a diagrammatic elevational view of the vehicle; and

Fig. 3 is a schematic illustration of a suspension system for the vehicle.

25 Referring to the drawings, there is illustrated an articulated dump truck according to the invention indicated generally by the reference numeral 1. The dump truck 1 comprises a tractor unit 2 sitting on a single non-steering axle with wheels 3. The tractor unit 2 is connected to an associated trailer unit 5 having an open topped container 6 mounted on a chassis 7 with wheels 8. The tractor unit 2 is connected to the trailer unit 5 by means of an articulating hitch indicated generally by the reference numeral 10. The hitch 10 is free to rotate about longitudinal and vertical axes of the truck 1 but is unable
30 to rotate about a transverse axis of the truck 1. Steering is achieved by the forced articulation of the hitch 10 about its vertical axis creating a turn angle between the tractor unit 2 and trailer unit 5. Turning of the tractor unit 2 relative to the trailer unit 5 is shown in broken outline in Fig. 1. A sensor 12 mounted at the hitch 10 detects turning of the tractor unit 2 relative to the trailer unit 5 and locks a suspension system of the

tractor unit 2 when a preset turning of the tractor unit 2 relative to the trailer unit 5 is reached.

Figure 3 schematically shows a hydropneumatic suspension for the tractor unit 2. This essentially comprises a right hand hydropneumatic spring assembly indicated generally by the reference numeral 22 operably connected to a right hand front wheel 3 of the tractor unit 2. Similarly a left hand hydropneumatic spring assembly 24 is operably connected to a left front wheel 3 of the tractor unit 2. The hydropneumatic spring assemblies 22, 24 are similar and essentially comprise a gas cylinder 25 having a gas chamber 26 and oil chamber 27. A separator piston 28 divides the gas cylinder 25 into the gas chamber 26 and oil chamber 27. An oil line 29 connects through a restrictor 30 and a lockout valve 32 with a pair of oil cylinders 34, 35 operably connected to the associated wheel 3 for controlling vertical movement of the wheel 3.

Each lockout valve 32 is a solenoid operated valve having a normally open position. A switch 36 associated with the sensor 12 is operable to supply power to close the lockout valve 32 when the tractor unit 2 turns beyond a pre-set angle relative to the trailer unit 5 as detected by the sensor 12. When closed the lockout valve 32 isolates the oil cylinders 34, 35 from the gas cylinder 25. When the lockout valve 32 is in the closed position the oil cylinders 34, 35 are hydraulically locked and vertical wheel travel is prevented.

The sensor 12 essentially comprises a proximity switch mounted on the vertical axis of the hitch 10 the targets for the proximity switch are mounted so that lockout only occurs for turning of the tractor unit 2 relative to the trailer unit 5 beyond a pre-set angle.

The steer or turn angle at which lockout occurs is selected to correspond to the maximum roll angle allowable for driver safety and/or comfort. The roll effect is limited by locking the suspension on the tractor unit 2 once the steer angle increases beyond a specified angle. This angle is effectively equivalent to the roll that would be experienced due to the centrifugal force, but is also infinitely variable within specified limits.

The invention is not limited to the embodiments hereinbefore described which may be varied in both construction and detail.

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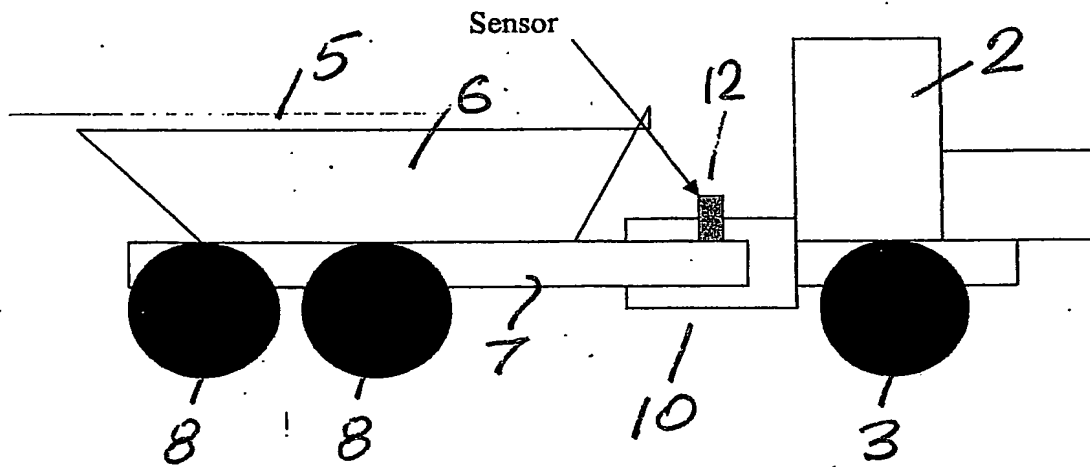
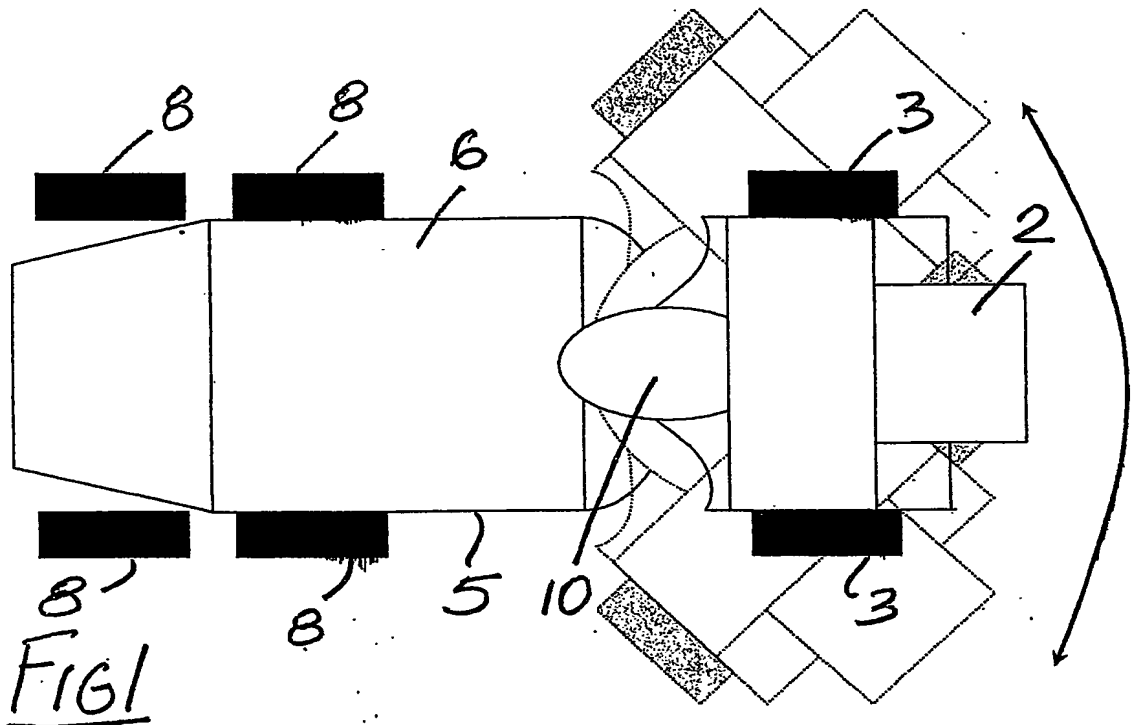
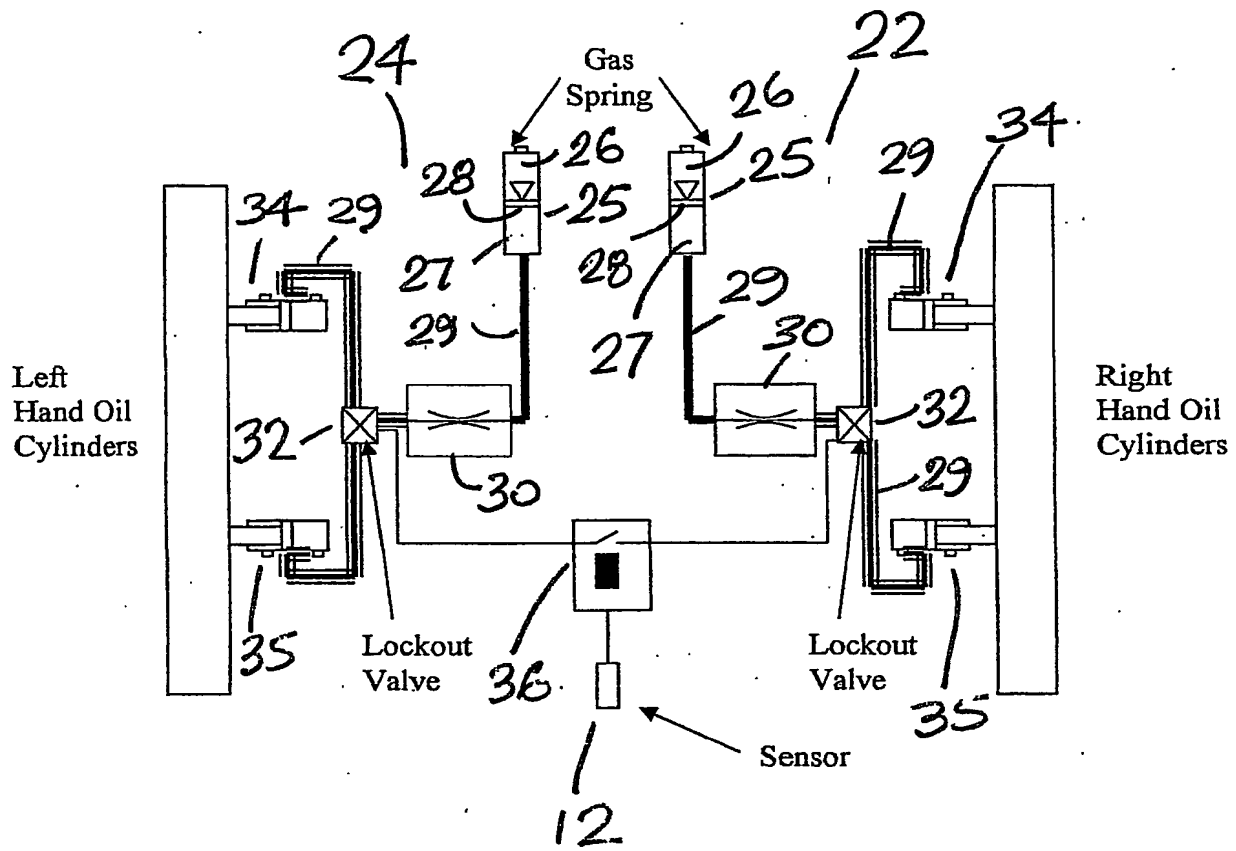


FIG 2

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Front of truck



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